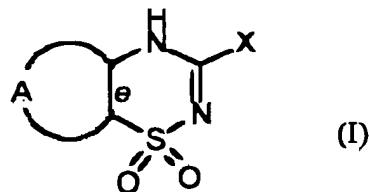


CLAIM AMENDMENTS

1. (currently amended) A process for the preparation of a compound of formula (I)



wherein

X is NR²R³, SR¹, S(=O)R¹, S(=O)₂R¹ or OR¹;

R¹ is hydrogen; C₃₋₆-cycloalkyl or (C₃₋₆-cycloalkyl)C₁₋₆-alkyl, wherein the C₃₋₆-cycloalkyl group is optionally mono- or polysubstituted with C₁₋₆-alkyl, halogen, hydroxy or C₁₋₆-alkoxy; a 3-6 membered saturated ring system comprising one or more nitrogen-, oxygen- or sulfur atoms, optionally being mono- or polysubstituted with halogen, cyano, trifluoromethyl, C₁₋₆-alkyl, C₁₋₆-alkoxy, C₁₋₆-alkoxy-C₁₋₆-alkyl, aryl, arylalkyl, hydroxy, oxo, nitro, amino, C₁₋₆-monoalkyl or dialkylamino; straight or branched C₁₋₁₈-alkyl, C₂₋₁₈-alkenyl or C₂₋₁₈-alkynyl, wherein each of the groups is optionally mono- or polysubstituted with halogen, hydroxy, C₁₋₆-alkoxy, C₁₋₆-alkylthio, C₃₋₆-cycloalkyl, nitro, amino, C₁₋₆-monoalkyl- or dialkylamino, cyano, oxo, formyl, acyl, carboxy, C₁₋₆-alkoxycarbonyl, carbamoyl, formylamino, C₁₋₆-alkylcarbonylamino, aryl, aryloxy, arylalkoxy; or bicycloalkyl, aryl, heteroaryl, arylalkyl or heteroarylalkyl, wherein each of the groups is optionally mono- or polysubstituted with halogen, hydroxy, C₁₋₆-alkyl, C₁₋₆-alkoxy, aryloxy, arylalkoxy, nitro, amino, C₁₋₆-monoalkyl- or dialkylamino, cyano, oxo, acyl or C₁₋₆-alkoxycarbonyl;

R² is hydrogen; hydroxy; C₁₋₆-alkoxy; or C₁₋₆-alkyl, C₃₋₆-cycloalkyl, C₂₋₆-alkenyl or C₂₋₆-alkynyl optionally mono- or polysubstituted with halogen;

R³ is hydrogen; C₃₋₆-cycloalkyl or (C₃₋₆-cycloalkyl)C₁₋₆-alkyl, wherein the C₃₋₆-cycloalkyl group is optionally mono- or polysubstituted with C₁₋₆-alkyl, halogen, hydroxy or C₁₋₆-alkoxy; a 3-6 membered saturated ring system comprising one or more nitrogen-, oxygen- or sulfur atoms; or straight or branched C₁₋₁₈-alkyl optionally mono- or polysubstituted with halogen, hydroxy, C₁₋₆-alkoxy, C₁₋₆-alkylthio, C₃₋₆-cycloalkyl, aryl, aryloxy, arylalkoxy, nitro, amino, C₁₋₆-monoalkyl- or dialkylamino, cyano, oxo, formyl, acyl, carboxy, C₁₋₆-alkoxycarbonyl, or carbamoyl; or

R³ is -OR⁴; -C(=Z)R⁴; -NR⁴R⁵; or bicycloalkyl, aryl, heteroaryl, arylalkyl or heteroarylalkyl, optionally mono- or polysubstituted with halogen, hydroxy, C₁₋₆-alkyl, C₁₋₆-alkoxy, aryloxy, arylalkoxy, nitro, amino, C₁₋₆-monoalkyl- or dialkylamino, cyano, oxo, acyl or C₁₋₆-alkoxycarbonyl;

R⁴ is hydrogen; C₃₋₆-cycloalkyl or (C₃₋₆-cycloalkyl)C₁₋₆-alkyl, wherein the C₃₋₆-cycloalkyl group is optionally mono- or polysubstituted with C₁₋₆-alkyl, halogen, hydroxy or C₁₋₆-alkoxy; a 3-6 membered saturated ring system comprising one or more nitrogen-, oxygen- or sulfur atoms; or straight or branched C₁₋₁₈-alkyl optionally mono- or polysubstituted with halogen, hydroxy, C₁₋₆-alkoxy, C₁₋₆-alkylthio, C₃₋₆-cycloalkyl, aryl, aryloxy, arylalkoxy, nitro, amino, C₁₋₆-monoalkyl- or dialkylamino, cyano, oxo, formyl, acyl, carboxy, C₁₋₆-alkoxycarbonyl, or carbamoyl;

Z is O or S;

R⁵ is hydrogen; C₁₋₆-alkyl; C₂₋₆-alkenyl; C₃₋₆-cycloalkyl optionally mono- or polysubstituted with C₁₋₆-alkyl, halogen, hydroxy or C₁₋₆-alkoxy; or

when R³ is -NR⁴R⁵, R⁴ and R⁵ together with the nitrogen atom form a 3-12 membered mono- or bicyclic system, in which one or more of the carbon atoms may be exchanged with nitrogen, oxygen or sulfur, each of these ring systems optionally being mono- or polysubstituted with halogen, C₁₋₆-alkyl, hydroxy, C₁₋₆-alkoxy, C₁₋₆-alkoxy-C₁₋₆-alkyl, nitro, amino, cyano, trifluoromethyl, C₁₋₆-monoalkyl- or dialkylamino, or oxo; or

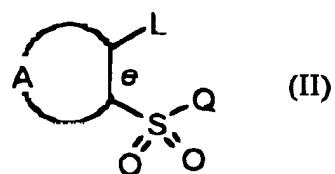
when X is -NR²R³, R² and R³ together with the nitrogen atom form a 3-12 membered mono- or bicyclic system, in which one or more of the carbon atoms may be exchanged with nitrogen, oxygen or sulfur, each of these ring systems optionally being mono- or polysubstituted with halogen, C₁₋₆-alkyl, hydroxy, C₁₋₆-alkoxy, C₁₋₆-alkoxy-C₁₋₆-alkyl, nitro, amino, cyano, trifluoromethyl, C₁₋₆-monoalkyl- or dialkylamino or oxo;

A together with the carbon atoms forming bond e of formula I represents a 5 membered heterocyclic system comprising one or more nitrogen-, oxygen- or sulfur atoms, the heterocyclic system optionally being mono- or polysubstituted with halogen; C₁₋₁₈-alkyl; C₃₋₆-cycloalkyl; hydroxy; C₁₋₆-alkoxy; C₁₋₆-alkoxy-C₁₋₆-alkyl; nitro; amino; cyano; cyanomethyl; perhalomethyl; C₁₋₆-monoalkyl- or dialkylamino; sulfamoyl; C₁₋₆-alkylthio; C₁₋₆-alkylsulfonyl; C₁₋₆-alkylsulfinyl; C₁₋₆-alkylcarbonylamino; arylthio, arylsulfinyl, arylsulfonyl, aryl, arylalkyl, or aryloxy, wherein the aryl group is optionally mono- or polysubstituted with C₁₋₆-alkyl, perhalomethyl, halogen, hydroxy or C₁₋₆-alkoxy; C₁₋₆-alkoxycarbonyl; C₁₋₆-alkoxycarbonyl-C₁₋₆-alkyl; carbamyl; carbamylmethyl; C₁₋₆-monoalkyl- or dialkylaminocarbonyl; C₁₋₆-monoalkyl- or dialkylaminothiocarbonyl; ureido; C₁₋₆-monoalkyl- or dialkylaminocarbonylamino; thiocarbamyl; thioureido; C₁₋₆-monoalkyl- or dialkylaminothiocarbonyl- amino; C₁₋₆-monoalkyl- or dialkylaminosulfonyl; carboxy; carboxy-C₁₋₆-alkyl; acyl; formyl; or a 5 - 6 membered nitrogen, oxygen or sulfur containing ring, optionally substituted with C₁₋₆-alkyl or phenyl, wherein the phenyl group is optionally mono- or polysubstituted with C₁₋₆-alkyl, perhalomethyl, halogen, hydroxy or C₁₋₆-alkoxy; or

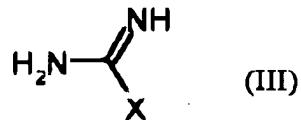
a salt thereof with a pharmaceutically acceptable acid or base, or an optical isomer thereof, or a tautomeric form thereof

comprising one of the following methods:

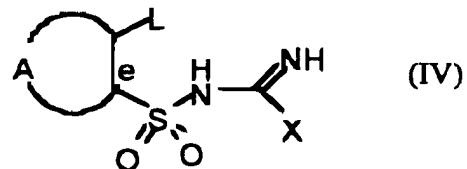
- a) reacting a compound of formula (II)



wherein A is as defined above, L is a leaving group selected from alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, nitro or halogen and Q is halogen, with a compound of formula (III),

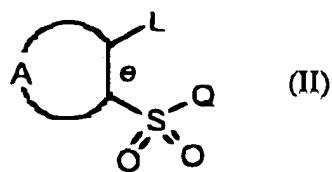


wherein X is NR²R³, wherein R² and R³ are defined above, or a suitable salt thereof, in the presence of a base in solvent 1, to form a compound of formula (IV)

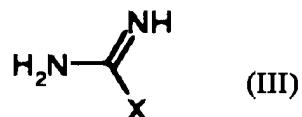


wherein A, L and X are as defined above, and
cyclizing the compound of formula (IV) in solvent 2, optionally in the presence of a base,
and optionally with a metal catalyst, to form a compound of formula (I), or

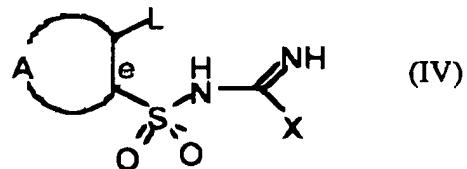
b) reacting a compound of formula (II)



wherein A is as defined above, L is a leaving group selected from alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl or halogen and Q is halogen, with a compound of formula (III),



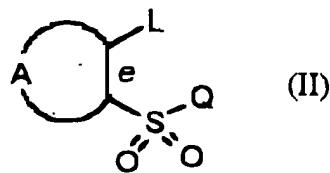
wherein X is SR¹, S(=O)R¹ or S(=O)₂R¹, wherein R¹ is defined above, or a suitable salt thereof, in the presence of a base in solvent 1, to form a compound of formula (IV)



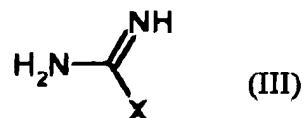
wherein A, L and X are as defined above, and

cyclizing the compound of formula (IV) in solvent 2, optionally in the presence of a base, and optionally with a metal catalyst, to form a compound of formula (I), or

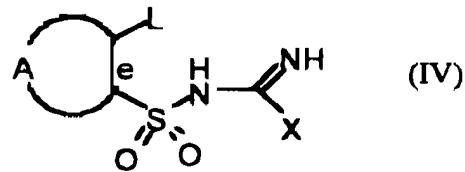
c) reacting a compound of formula (II)



wherein A is as defined above, L is a leaving group selected from alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl or halogen and Q is halogen, with a compound of formula (III),

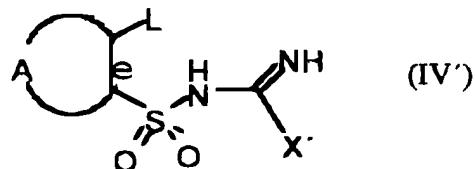


wherein X is OR¹, wherein R¹ is defined above, or a suitable salt thereof, in the presence of a base in solvent 1, to form a compound of formula (IV)



wherein A, L and X are as defined above, and
cyclizing the compound of formula (IV) in solvent 2, optionally in the presence of a base, and optionally with a metal catalyst, to form a compound of formula (I), or

d) transforming a compound of formula (IV) in c) to a compound of formula (IV').

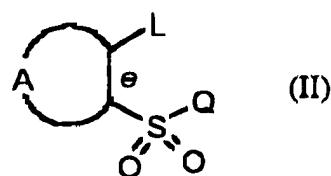


wherein A, L and X are as defined in c), and X of (IV) is transformed into X', wherein X' is selected from the groups defined for X, with the proviso that X' ≠ X, and

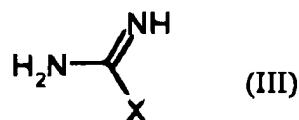
cyclizing the compound of formula (IV') in solvent 2, optionally in the presence of a base, and optionally with a metal catalyst, to form a compound of formula (I).

2. (currently amended) A process according to claim 1 comprising:

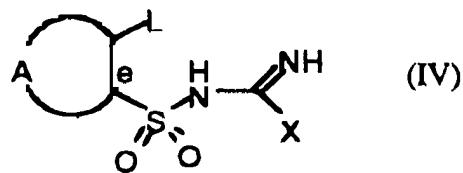
reacting a compound of formula (II)



wherein A is as defined above, L is a leaving group selected from alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, nitro or halogen and Q is halogen, with a compound of formula (III)



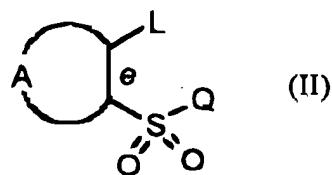
wherein X is NR²R³, wherein R² and R³ are defined above, or a suitable salt thereof, in the presence of a base in solvent 1, to form a compound of formula (IV)



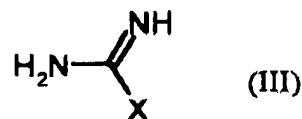
wherein A, L and X are as defined above, and cyclizing the compound of formula (IV) in solvent 2, optionally in the presence of a base, and optionally by treatment with a metal catalyst, to form a compound of formula (I).

3. (currently amended) A process according to claim 1 comprising:

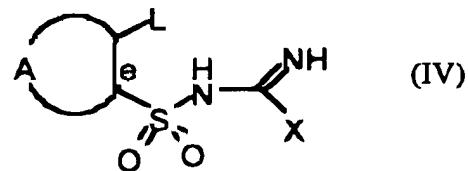
reacting a compound of formula (II)



wherein A is as defined above, L is a leaving group selected from alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, nitro or halogen and Q is halogen, with a compound of formula (III),



wherein X is SR¹, S(=O)R¹ or S(=O)₂R¹, wherein R¹ is defined above, or a suitable salt thereof, in the presence of a base in solvent 1, to form a compound of formula (IV)

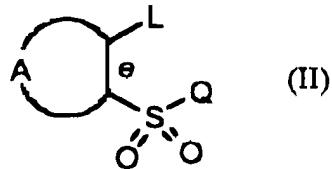


wherein A, L and X are as defined above, and

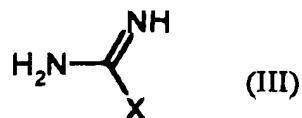
cyclizing the compound of formula (IV) in solvent 2, optionally in the presence of a base and, optionally by treatment with a metal catalyst, to form a compound of formula (I). |

4. (currently amended) A process according to claim 1 comprising:

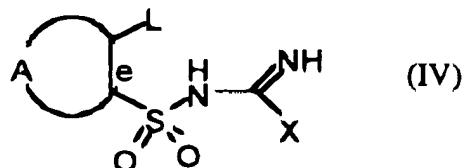
reacting a compound of formula (II)



wherein A is as defined above, L is a leaving group selected from alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, nitro or halogen and Q is halogen, with a compound of formula (III),



wherein X is OR¹, wherein R¹ is defined above, or a suitable salt thereof, in the presence of a base in solvent 1, to form a compound of formula (IV)

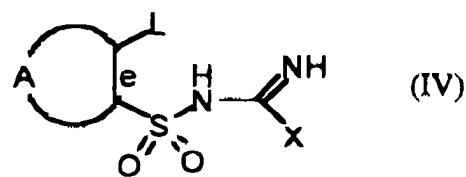


wherein A, L and X are as defined above, and

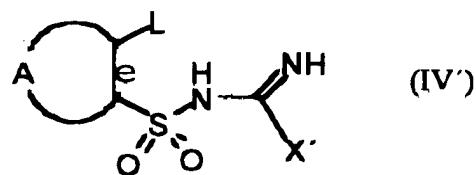
cyclizing the compound of formula (IV) in solvent 2, optionally in the presence of a base and, optionally by treatment with a metal catalyst, to form a compound of formula (I).

5. (currently amended) A process according to claim 1 comprising:

transforming a compound of formula (IV)



into a compound of formula (IV')

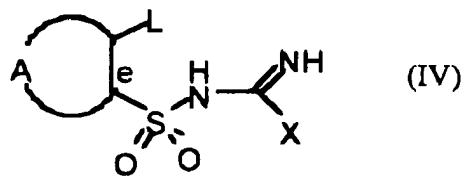


wherein X is transformed into X', wherein X' is selected from the groups defined for X, with the proviso that X' ≠ X, and

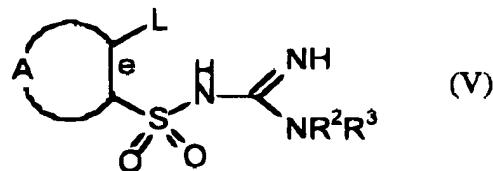
cyclizing the compound of formula (IV') in solvent 2, optionally in the presence of a base and, optionally by treatment with a metal catalyst, to form a compound of formula (I).

6. (currently amended) A process according to claim 1 comprising:

transforming a compound of formula (IV)



wherein A, and L are as defined above and X is SR¹, S(=O)R¹ or S(=O)₂R¹, wherein R¹ is defined above, into a compound of formula (V)



wherein A, L and R² and R³ are as defined above, and cyclizing the compound of formula (V) in solvent 2, optionally in the presence of a base and, optionally by treatment with a metal catalyst, to form a compound of formula (I).

Claim 7 (cancelled)

8. (original) A process according to claim 1, wherein the process further comprises cyclizing the compound of formula (IV) in solvent 2 in the presence of a base and by treatment with a metal catalyst.

Claims 9 and 10 (cancelled)

11. (original) A process according to claim 1, wherein the process further comprises cyclizing the compound of formula (IV) in solvent 2 by treatment with a metal catalyst without the presence of a base.

Claims 12 and 13 (cancelled)

14. (original) A process according to claim 1, wherein the base is selected from sodium hydroxide, potassium carbonate, cesium carbonate or potassium hydroxide.

15. (original) A process according to claim 1, wherein solvent 1 is selected from diethyl ether, acetone, toluene or t-butyl-methyl ether.

16. (original) A process according to claim 1, wherein solvent 2 is selected from *N,N*-dimethylformamide, toluene, xylene, 1-butanol, N-methyl-2-pyrrolidinone, sulfolane, dimethylsulfoxide, DMPU or water.

17. (original) A process according to claim 1, wherein the metal catalyst is selected from copper bronze, copper oxide, copper chloride, copper bromide or copper iodide.

18. (previously amended) A compound selected from the group consisting of:

3-Amino-6-chloro-4H-thieno[3,2-e]-1,2,4-thiadiazine 1,1-dioxide;

7-Bromo-6-chloro-3-propylaminothieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide;

7-Bromo-3-(*sec*-butylamino)-6-chloro-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide;

7-Bromo-6-chloro-3-cyclobutylamino-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide;

6-Chloro-3-methylsulfanyl-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide; or

6-Chloro-3-methylsulfinyl-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide.

19. (previously amended) A compound selected from the group consisting of:

6-Bromo-3-methylsulfanyl-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide; 6-Bromo-3-

methylsulfinyl-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide; 3-Amino-6-bromo-4H-

thieno[3,2-e]-1,2,4-thiadiazine 1,1-dioxide; 6-Chloro-3-ethylamino-4H-thieno[2,3-e]-

1,2,4-thiadiazine 1,1-dioxide;

6-Chloro-3-propylamino-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide;

3-Isopropylamino-6-methyl-4H-thieno[3,2-e]-1,2,4-thiadiazine 1,1-dioxide;

6-Methyl-3-propylamino-4H-thieno[3,2-e]-1,2,4-thiadiazine 1,1-dioxide; or

3-*sec*-Butylamino-6-methyl-4H-thieno[3,2-e]-1,2,4-thiadiazine 1,1-dioxide.

20. (original) A pharmaceutical composition for the treatment or prophylaxis of Type I or Type II diabetes comprising a compound according to claim 18 and a pharmaceutically acceptable carrier.
21. (original) A pharmaceutical composition for the treatment or prophylaxis of Type I or Type II diabetes comprising a compound according to claim 19 and a pharmaceutically acceptable carrier.
22. (original) A method of treating Type I or Type II diabetes which comprises administering an effective or prophylactic amount of a compound according to claim 18 to a person suffering from Type I or Type II diabetes.
23. (original) A method of treating Type I or Type II diabetes which comprises administering an effective or prophylactic amount of a compound according to claim 19 to a person suffering from Type I or Type II diabetes.